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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: A PROCESS FOR THE PRODUCTION OF LINEAR LOW-DENSITY POLYETHYLENE COMPOSITION

(57) Abstract: The present invention concerns a process for producing bimodal linear low-density polyethylene polymer compositions, useful for making films. The polymer compositions have a melt flow rate MFR<sub>2</sub> of 0.4 to 1.0 g/10 min and a density of 918 to 925 kg/m<sup>3</sup>. The process to produce the polymer compositions involves copolymerising ethylene with an alpha-olefin comonomer in a loop reactor to produce a low molecular weight polymer having a melt flow rate MFR<sub>2</sub> of 50 to 500 g/10 min and a density of 945 to 953 kg/m<sup>3</sup>. The polymerisation is continued in a gas phase reactor to produce a high molecular weight polymer such, that the final polymer composition has the desired properties. The final composition contains from 41 to 48 % by weight of the low molecular weight polymer and from 59 to 52 % by weight of the high molecular weight polymer. The resulting films have an excellent visual appearance and good mechanical properties. The compositions can easily be converted to films. The process can be operated a long time without a shutdown.



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## INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 03/00500

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 C08F297/08 C08L23/08

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C08F C08L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0 692 515 A (UNION CARBIDE CHEM PLASTIC) 17 January 1996 (1996-01-17) cited in the application	1-6
X	page 7, line 1 -page 7, line 5; example 2 -----	7-10
Y	US 5 326 835 A (AHVENAINEN ANTERO ET AL) 5 July 1994 (1994-07-05) the whole document -----	1-6

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*G\* document member of the same patent family

Date of the actual completion of the international search

22 September 2003

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Authorized officer

Van Golde, L

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/FI 03/00500

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
  
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
  
2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
  
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
  
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-6

A specific process for producing a bimodal low-density ethylene blockcopolymer suitable for film preparation and having an MFR2 of 0.4 to 1.0 g/10 min and a density of 918 to 925 kg/m<sup>3</sup> comprising 41 to 48 % by weight of a first low molecular weight ethylene copolymer block having an MFR2 of 50 to 500 g/10 min and a density of 940 to 955 kg/m<sup>3</sup> and 59 to 52 % by weight of a second high molecular weight ethylene copolymer block.

2. Claims: 7-10

A film made of a linear low-density polyethylene composition having an MFR2 of 0.4 to 1.0 g/10 min and a density of 918 to 925 kg/m<sup>3</sup> comprising (i) 41 to 48 % by weight of a low molecular weight component having an MFR2 of 50 to 500 g/10 min and a density of 940 to 955 kg/m<sup>3</sup> and (ii) 59 to 52 % by weight of a high molecular weight component having a lower MFR2 and a lower density than the low molecular weight component (i).

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

FI 03/00500

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